



## LM833

Preliminary

CMOS IC

### DUAL OPERATIONAL AND LOW VOLTAGE NOISE AMPLIFIER

#### DESCRIPTION

The UTC **LM833** is integrated circuit amplifiers which combine dual operational and low voltage noise ( $4.5nV/\sqrt{Hz}$ ). It is particularly suited to audio applications.

It offers excellent phase/gain margins and a very low distortion (0.002%).

In addition, the UTC **LM833** has high frequency performances (15 MHz gain bandwidth product, 7V/ $\mu$ s slew rate).

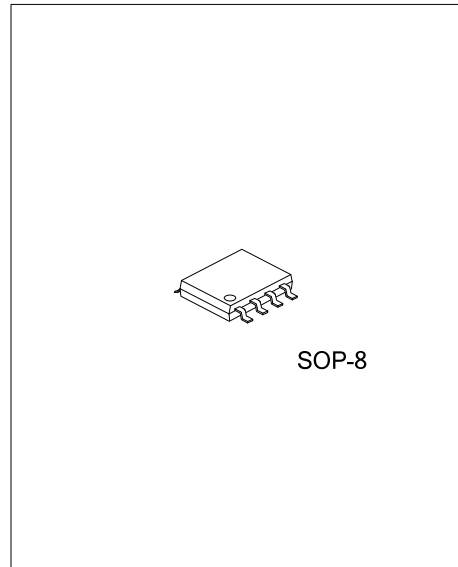
#### FEATURES

- \* High slew rate: 7V/ $\mu$ s
- \* High gain bandwidth product: 15MHz
- \* Excellent frequency stability
- \* Low distortion: 0.002%
- \* Low voltage noise: 4.5nV/ $\sqrt{Hz}$

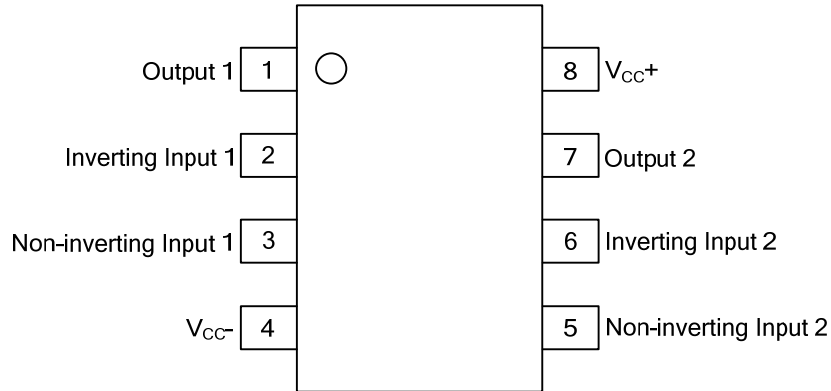
#### ORDERING INFORMATION

Ordering Number		Package	Packing
Lead Free	Halogen Free		
LM833L-S08-T	LM833G-S08-T	SOP-8	Tube
LM833L-S08-R	LM833G-S08-R	SOP-8	Tape Reel

<p>LM833L-S08-R</p> <p>(1)Packing Type (2)Package Type (3)Lead Free</p>	<p>(1) T: Tube, R: Tape Reel (2) S08: SOP-8 (3) L:Lead Free, G: Halogen Free</p>
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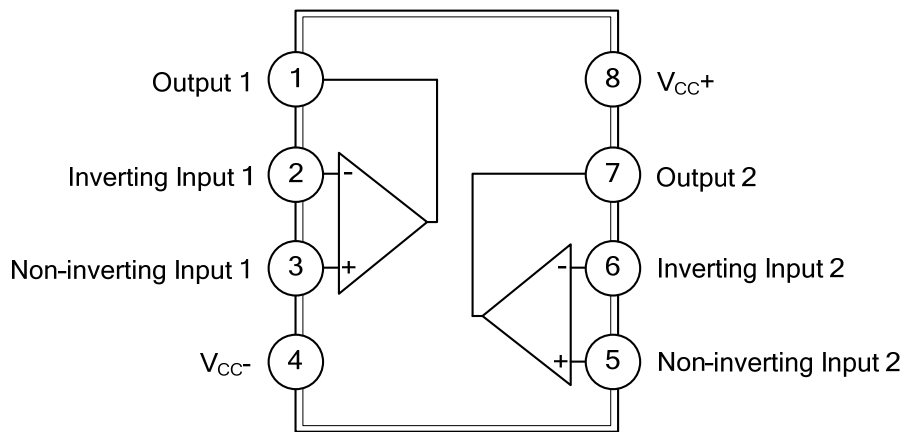
■ PIN CONFIGURATION



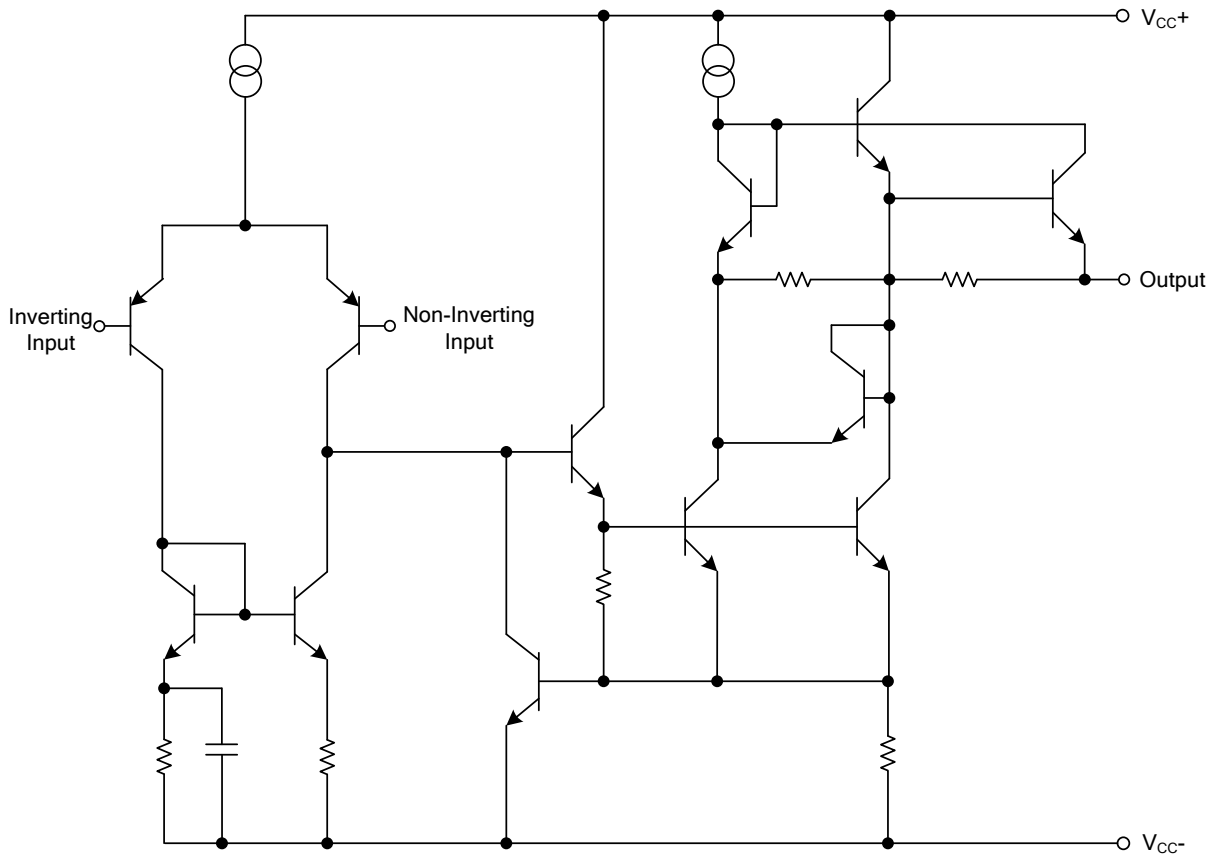
■ PIN DESCRIPTION

PIN NO.	PIN NAME	DESCRIPTION
1	Output 1	The output of channel 1
2	Inverting Input 1	The inverting input of channel 1
3	Non-inverting Input 1	The non-inverting input of channel 1
4	V <sub>CC-</sub>	Power supply
5	Non-inverting Input 2	The non-inverting input of channel 2
6	Inverting Input 2	The inverting input of channel 2
7	Output 2	The output of channel 2
8	V <sub>CC+</sub>	Power supply

■ BLOCK DIAGRAM



■ SCHEMATIC DIAGRAM



### ■ ABSOLUTE MAXIMUM RATING

PARAMETER	SYMBOL	RATINGS	UNIT
Supply Voltage	$V_{CC}$	$\pm 18$ or $+36$	V
Differential Input Voltage (Note 1)	$V_{ID}$	$\pm 30$	V
Input Voltage (Note 1)	$V_{IN}$	$\pm 15$	V
Maximum Power Dissipation (Note 2)	$P_D$	500	mW
Junction Temperature	$T_J$	+150	$^{\circ}\text{C}$
Storage Temperature	$T_{STG}$	-65~150	$^{\circ}\text{C}$

Notes: 1. Either or both input voltages must not exceed the magnitude of  $V_{CC+}$  or  $V_{CC-}$ .  
2. Power dissipation must be considered to ensure maximum junction temperature ( $T_J$ ) is not exceeded.

### ■ OPERATING CONDITIONS

PARAMETER	SYMBOL	VALUE	UNIT
Supply Voltage	$V_{CC}$	$\pm 2.5 \sim \pm 15$	V
Operating Free-Air Temperature Range	$T_{OPER}$	-40~105	$^{\circ}\text{C}$

### ■ ELECTRICAL CHARACTERISTICS

( $V_{CC+} = +15\text{V}$ ,  $V_{CC-} = -15\text{V}$ ,  $T_{AMB} = 25^{\circ}\text{C}$  (unless otherwise specified))

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT	
Input Offset Voltage	$V_{IO}$	$R_S = 10\Omega$ , $V_O = 0\text{V}$ , $V_{IC} = 0\text{V}$		0.3	5	mV	
Input Offset Voltage Drift	$DV_{IO}$	$R_S = 10\Omega$ , $V_O = 0\text{V}$ , $T_{MIN} \leq T_{AMB} \leq T_{MAX}$		2		$\mu\text{V}/^{\circ}\text{C}$	
Input Offset Current	$I_{IO}$	$V_O = 0\text{V}$ , $V_{IC} = 0\text{V}$		25	200	nA	
Input Bias Current	$I_{IB}$	$V_O = 0\text{V}$ , $V_{IC} = 0\text{V}$		500	1000	nA	
Input Common Mode Voltage Range	$V_{ICM}$		$\pm 12$	$\pm 14$		V	
Large Signal Voltage Gain	$A_{VD}$	$R_L = 2\Omega$ , $V_O = \pm 10\text{V}$	90	100		dB	
Output Voltage Swing	$\pm V_{OPP}$	$V_{ID} = \pm 1\text{V}$	$R_L = 2.0\text{k}\Omega$	10	13.7		V
			$R_L = 2.0\text{k}\Omega$		-14	-10	V
			$R_L = 10\text{k}\Omega$	12	13.9		V
			$R_L = 10\text{k}\Omega$		-14.4	-12	V
Common-Mode Rejection Ratio	CMR	$V_{IC} = \pm 13\text{V}$	80	100		dB	
Supply Voltage Rejection Ratio	SVR	$V_{CC+}/V_{CC-} = +15\text{V}/-15\text{V} \sim +5\text{V}/-5\text{V}$	80	105		dB	
Supply Current	$I_{CC}$	$V_O = 0\text{V}$ , all amplifiers		4	8	mA	
Slew Rate	SR	$V_I = -10\text{V} \sim +10\text{V}$ , $R_L = 2\text{k}\Omega$ , $A_V = +1$	5	7		$\text{V}/\mu\text{s}$	
Gain Bandwidth Product	GBW	$R_L = 2\text{k}\Omega$ , $C_L = 100\text{pF}$ , $f = 100\text{kHz}$	10	15		$\text{MHz}$	
Unity Gain Bandwidth	B	open loop		9		$\text{MHz}$	
Phase Margin	$\phi_m$	$R_L = 2\text{k}\Omega$		60		Degrees	
Equivalent Input Noise Voltage	$e_N$	$R_S = 100\Omega$ , $f = 1\text{kHz}$		4.5		$\text{nV}/\sqrt{\text{Hz}}$	
Equivalent Input Noise Current	$i_N$	$f = 1\text{kHz}$		0.5		$\text{pA}/\sqrt{\text{Hz}}$	
Total Harmonic Distortion	THD	$R_L = 2\text{k}\Omega$ , $f = 20\text{Hz} \sim f = 20\text{kHz}$ , $V_O = 3V_{RMS}$ , $A_V = +1$		0.002		%	
Channel Separation	$V_{O1}/V_{O2}$	$f = 20\text{Hz} \sim f = 20\text{kHz}$		120		dB	
Full Power Bandwidth	PBW	$V_O = 27V_{PP}$ , $R_L = 2\text{k}\Omega$ , $\text{THD} \leq 1\%$		120		kHz	

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